



CapeTraits: Patterns of functional trait variation and diversity across the Greater Cape Floristic Region and comparison with other Mediterranean ecosystems

Phil Townsend, Henry Frye, Kyle Kovach, Jasper Slingsby, Ryan Pavlick, Fabian Schneider, Jeannine Cavender-Bares



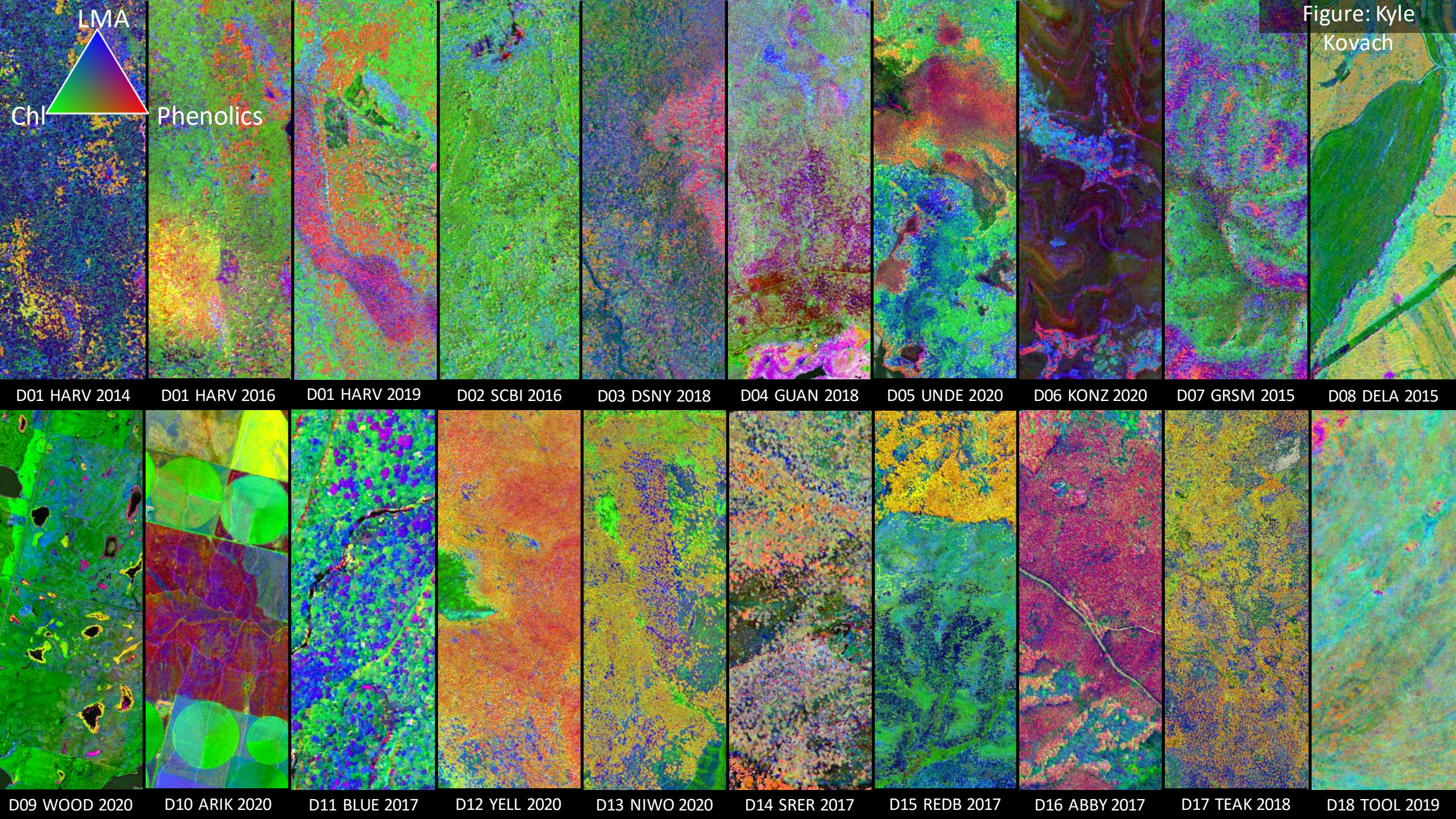
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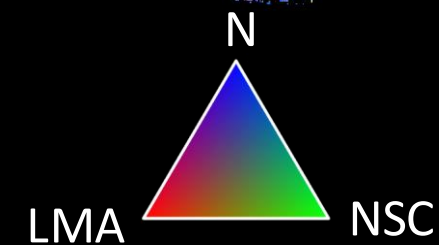
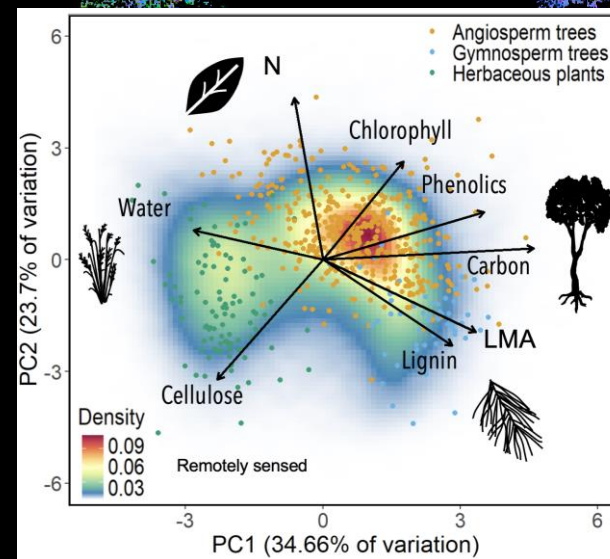
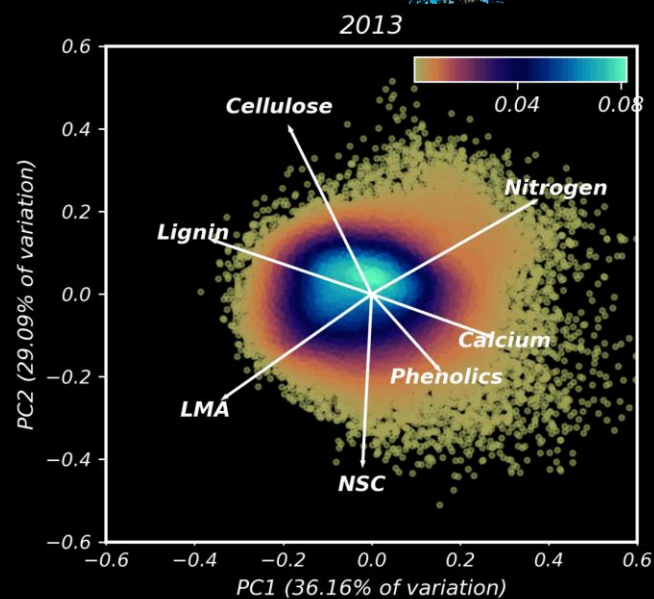
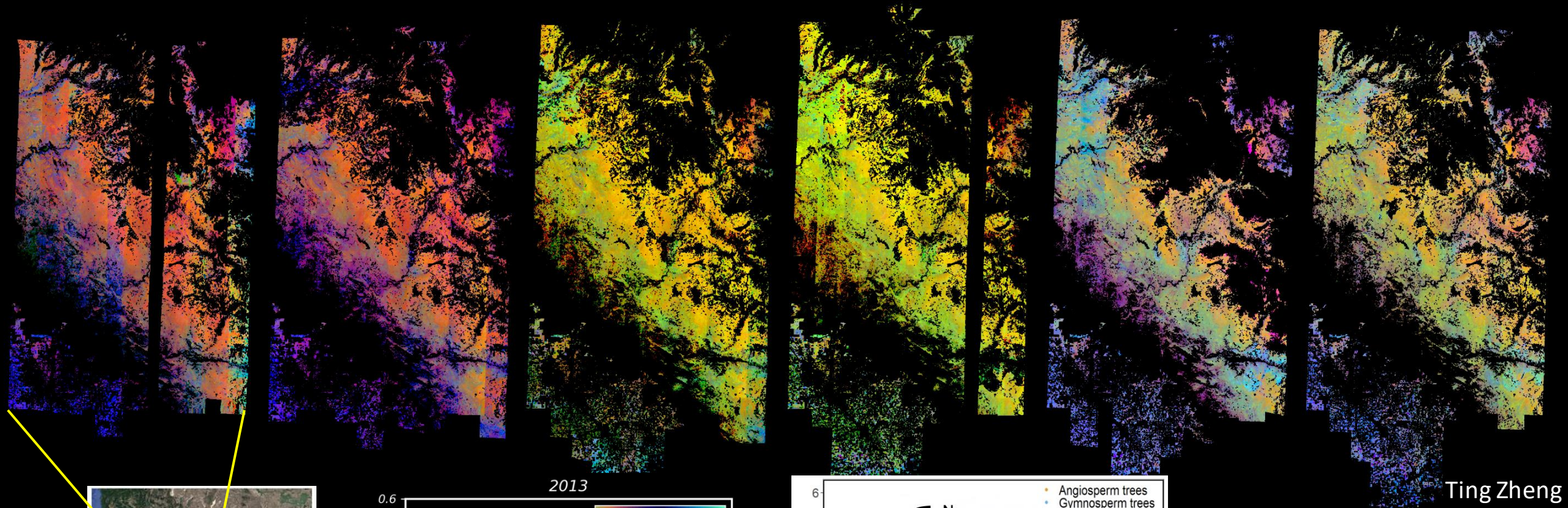
EnSpec



Jet Propulsion Laboratory
California Institute of Technology







Ting Zheng

Please see posters:

Tuesday: Ryan Pavlick (1-31)

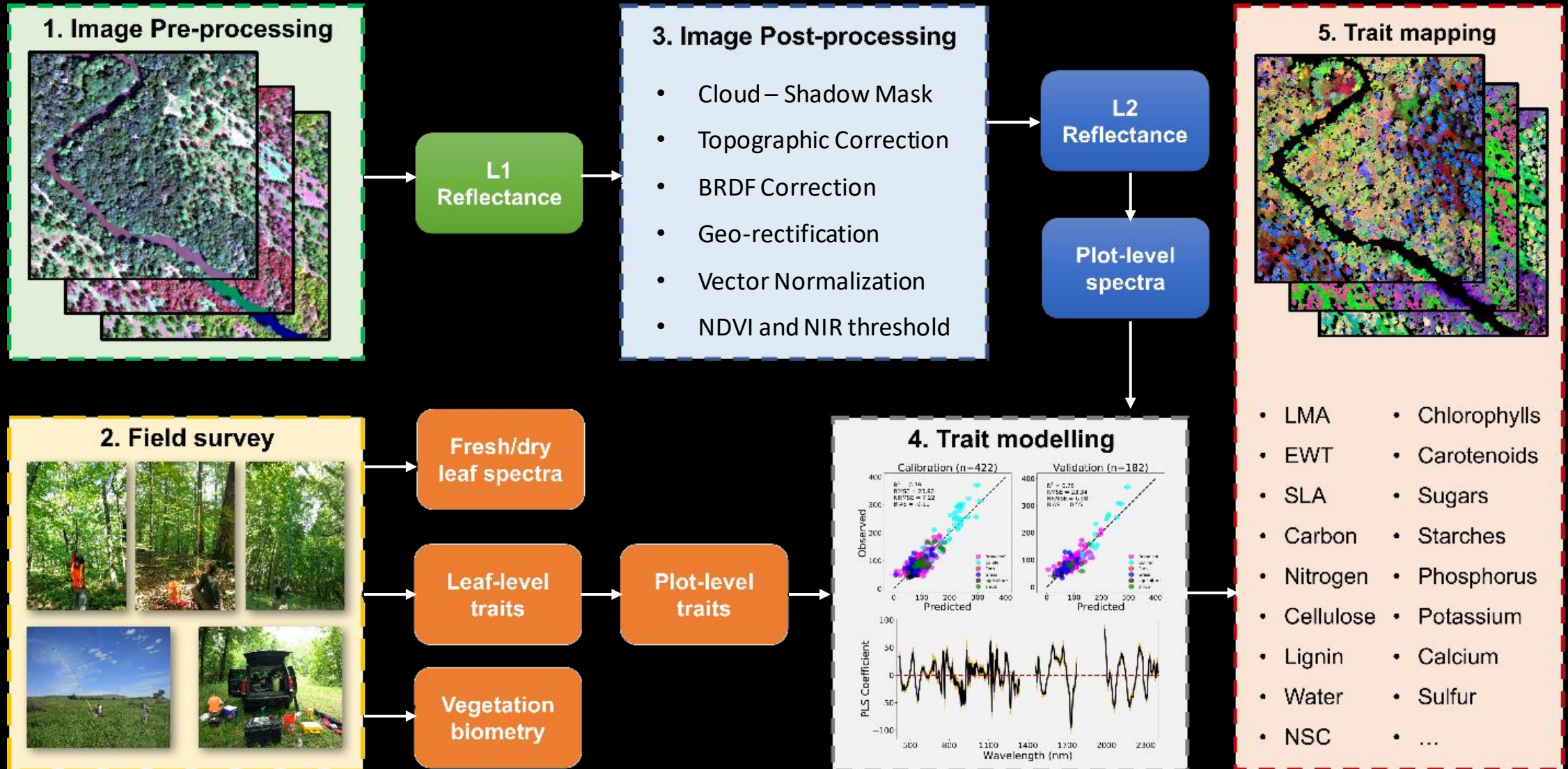
Wednesday: Ting Zheng (2-52)

Thursday: Natalie Queally (3-28)

Main Ideas

- Understand patterns of foliar trait variation in the BioSCape domain using AVIRIS-NG, leaf measurements and phylogeny
 - Leverage other available geospatial data and plot measurements
- Does functional trait composition and diversity mirror that of other Mediterranean ecosystems?
 - Theory on habitat filtering and natural selection might predict that vegetation functional traits (and trait variation) would be comparable to other Mediterranean systems due to convergent trait evolution and habitat selection by preadapted lineages in similar climates/environments
 - Alternatively, Cape flora may exhibit distinct trait values and additional variation as a consequence of its unique biogeographic and evolutionary history and geology that have resulted in its phylogenetic distinctiveness
- Trait-mapping questions: generality of algorithms within biomes
 - Fractional cover effects

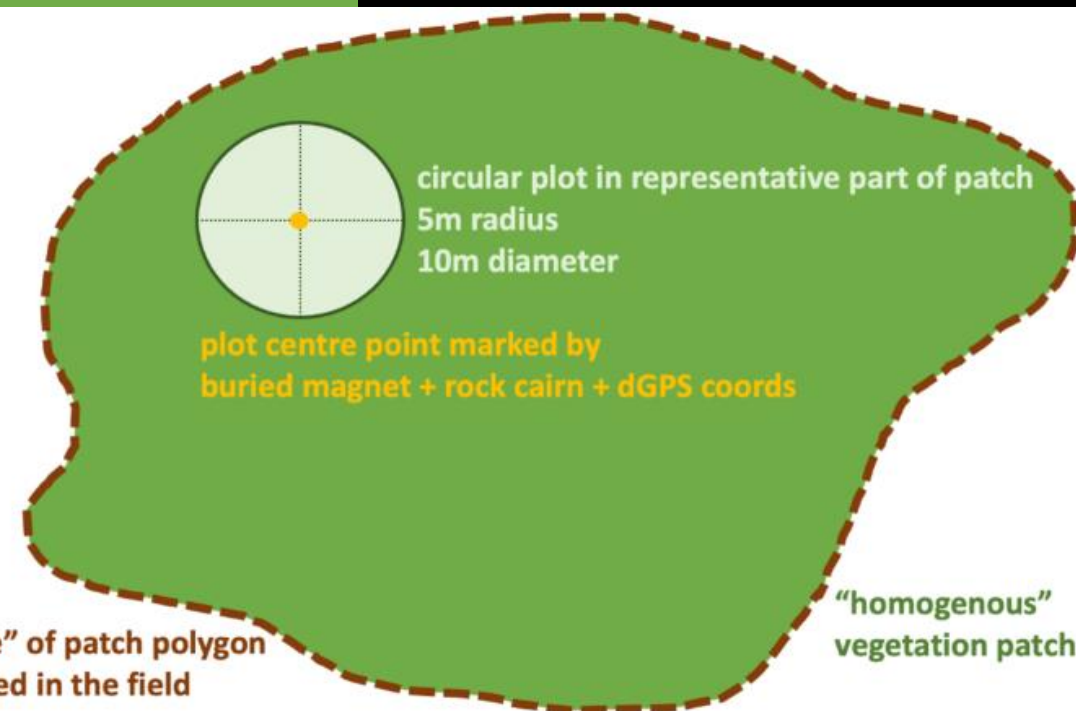
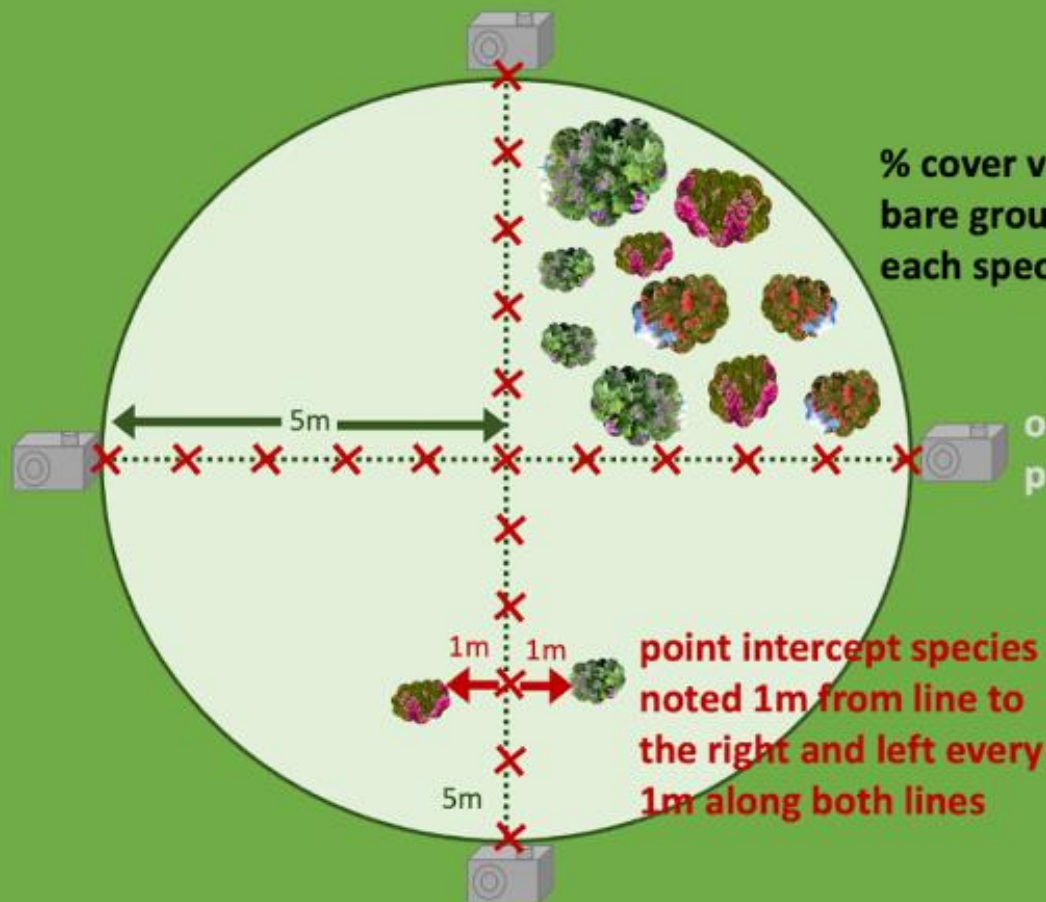
AVIRIS-NG Flights and Foliar Sampling October-December, 2023



% cover visual estimate per quadrant:
bare ground & rock
each species more than 5% cover

oblique & landscape
photos at each corner

Identify species comprising 80% cover
Additional work to quantify species
biodiversity using rarefaction

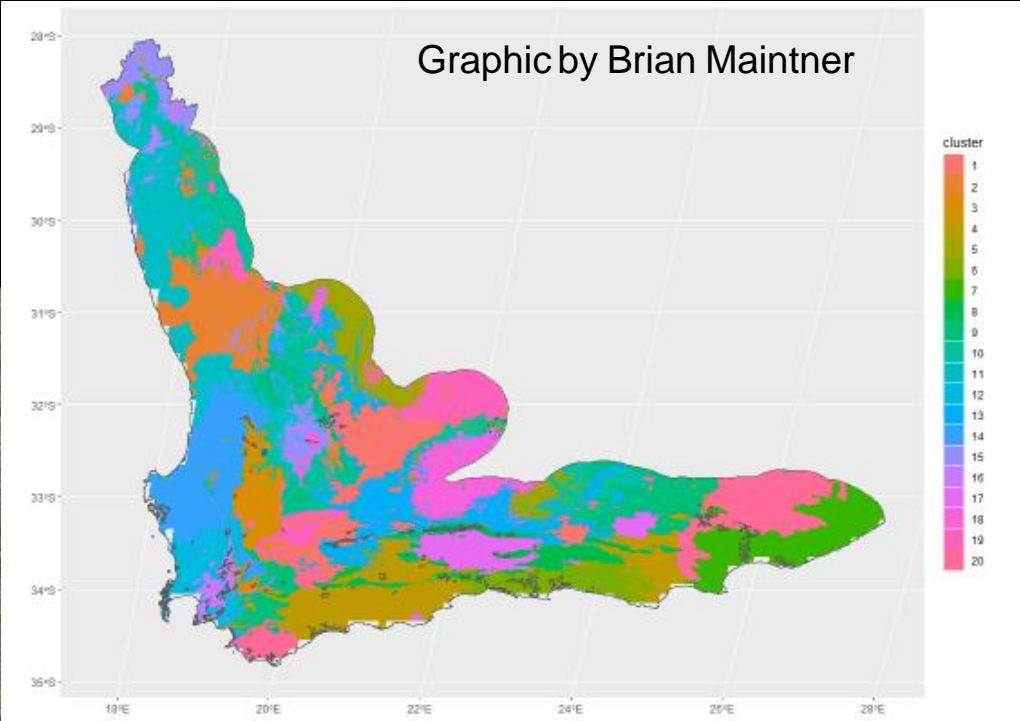
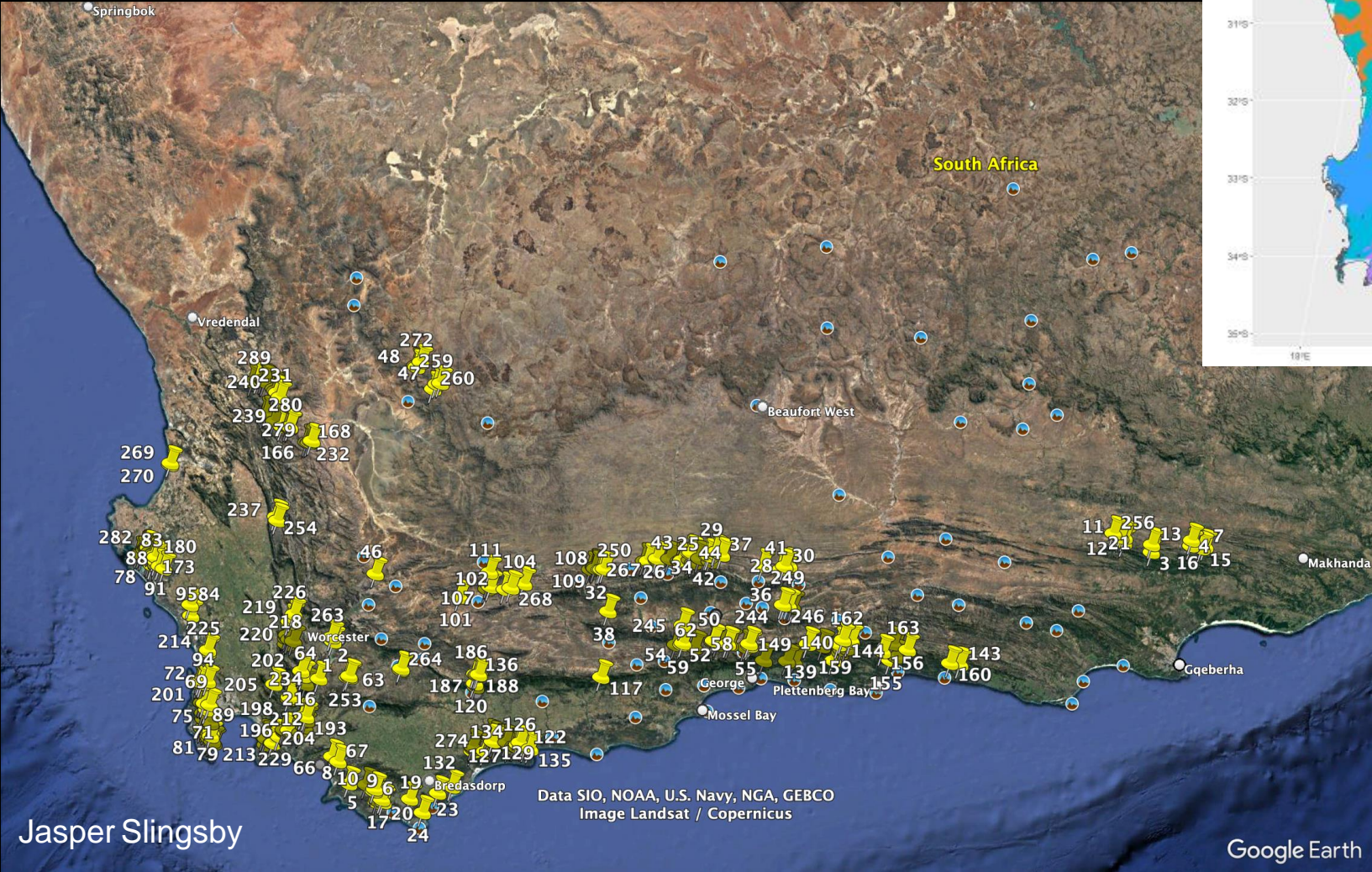


From BioSCape Implementation Plan

- Field sampling to support several projects
- Community-weighted mean upscaling

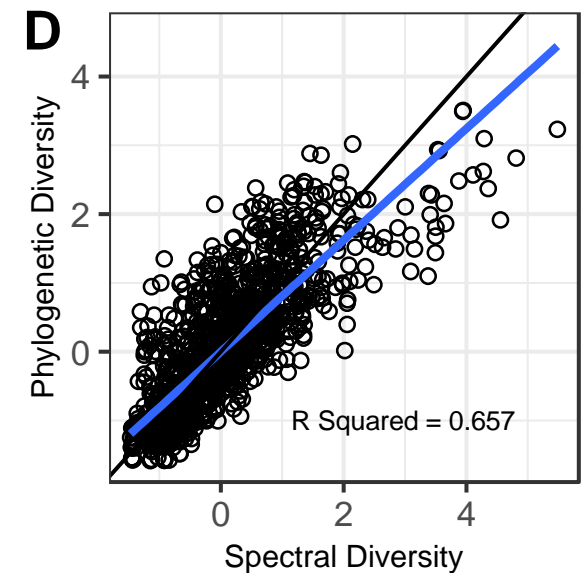
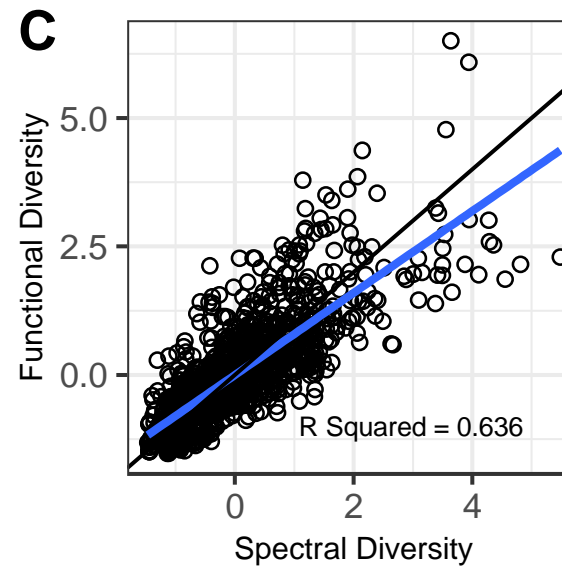
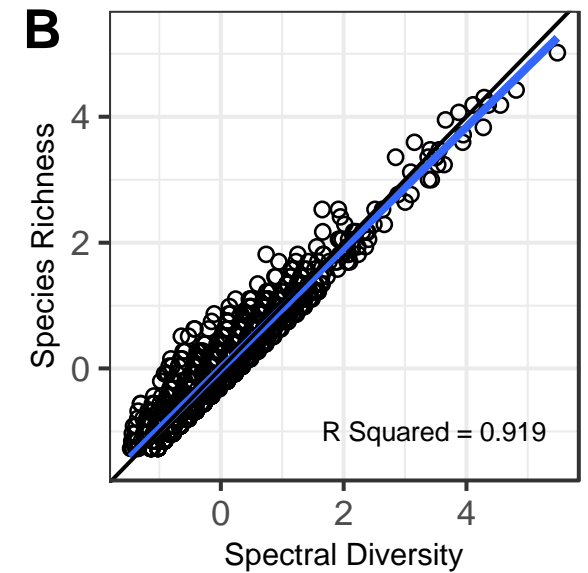
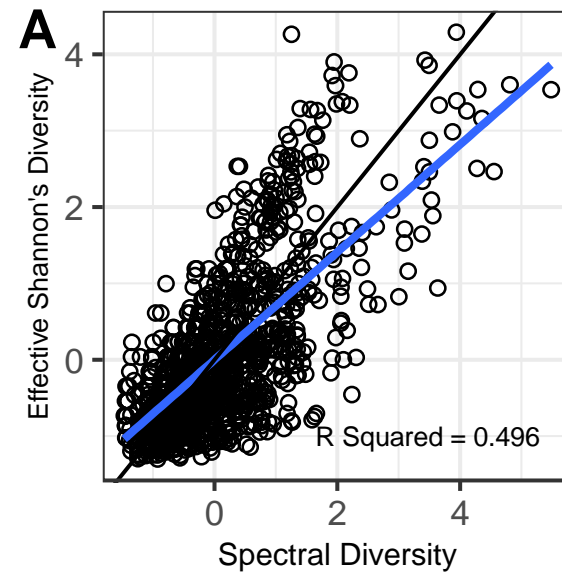
Plot locations selected and composition characterized in advance

We will sample foliage during flight period (support multiple projects)



Henry Frye, Project Postdoc

Leaf-level spectral diversity has a strong link to species, functional, and phylogenetic diversity across the Greater Cape Floristic Region



Products and Outcomes

- Extensive field data set of spectra, traits and composition
- Maps of foliar traits and functional diversity
- Drivers of trait patterns and trait-trait relationships
- Comparison with other Mediterranean ecosystems (California)
- Capacity building (field spectroscopy and trait measurements)
- South African collaborators and graduate students

